CLAIMS

1. (currently amended) An isolated and purified poly(ADP-ribose) polymerase (PARP) homolog selected from the group consisting of human PARP2 (SEQ ID NO: 2), human PARP3 type 1 (SEQ ID NO:4), human PARP3 type 2 (SEQ ID NO:6), murine PARP long form (SEQ ID NO:8), murine PARP short form (SEQ ID NO:10), and functional equivalents thereof which are at least 85% homologous thereto, exhibit poly(ADP-ribose)-synthesizing activity, and have ~~having~~ an amino acid sequence which

a) has a functional NAD^+ binding domain comprising the sequence motif

$PX_n(S/T)GX_3GKGIYFA$ (SEQ ID NO:11)

in which n is an integral value from 1 to 5, and the X radicals are, independently of one another, any amino acid;

and

b) lacks a zinc finger sequence motif of the general formula

$CX_2CX_mHX_2C$ (SEQ ID NO:30)

in which

m is an integral value of 28 or 30, and the X radicals are, independently of one another, any amino acid;

~~said PARP homolog being selected from the group consisting of human PARP2 (SEQ ID NO: 2), human PARP3 type 1 (SEQ ID NO:4), human PARP3 type 2 (SEQ ID NO:6), murine PARP long form (SEQ ID NO:8), murine PARP short form (SEQ ID NO:10), and functional equivalents thereof which are at least 85% homologous~~.

2. (previously presented) A functional equivalent of a PARP homolog as claimed in claim 1, wherein the functional NAD^+ binding domain comprises one of the following general sequence motifs:

(S/T)XGLR(I/V)XPX$_n$(S/T)GX$_3$GKGIYFA (SEQ ID NO:12) or

LLWHG(S/T)X$_7$IL(S/T)XGLR(I/V)XPX$_n$(S/T)GX$_3$GKGIYFAX$_3$SKSAXY (SEQ ID NO:13)

in which

n is an integral value from 1 to 5, and the X radicals are, independently of one another, any amino acid.

3. (previously presented) A functional equivalent of a PARP homolog as claimed in claim 1, comprising at least another one of the following part-sequence motifs:

LX$_9$NX$_2$YX$_2$QLLX(D/E)X$_{10/11}$WGRVG (SEQ ID NO: 15),
AX$_3$FXKX$_4$KTXNXWX$_5$FX$_3$PXK (SEQ ID NO:16),
QXL(I/L)X$_2$IX$_9$MX$_{10}$PLGKLX$_3$QIX$_6$L (SEQ ID NO:17),
FYTXIPHXFGX$_3$PP (SEQ ID NO:18); and
KX$_3$LX$_2$LXDIEXAX$_2$L (SEQ ID NO:19),

in which the X radicals are, independently of one another, any amino acid.

4. (canceled)

5. (previously presented) A binding partner for PARP homologs as claimed in claim 1, selected from

a) antibodies and fragments thereof,

b) protein-like compounds which interact with a part-sequence of the protein, and

c) low molecular weight effectors which modulate the catalytic PARP activity or another biological function of a PARP molecule.

6. (previously presented) A nucleic acid comprising

a) a nucleotide sequence coding for at least one PARP homolog as claimed in claim 1, or the complementary nucleotide sequence thereof;

b) a nucleotide sequence which hybridizes with a sequence as specified in a) under stringent conditions; or

c) nucleotide sequences which are derived from the nucleotide sequences defined in a) and b) through the degeneracy of the genetic code.

7. (original) A nucleic acid as claimed in claim 6, comprising

a) nucleotides +3 to +1715 shown in SEQ ID NO:1;

b) nucleotides +242 to +1843 shown in SEQ ID NO:3;

c) nucleotides +221 to +1843 shown in SEQ ID NO:5;

d) nucleotides +112 to +1710 shown in SEQ ID NO:7; or

e) nucleotides +1 to +1584 shown in SEQ ID NO:9.

8. (previously presented) An expression cassette comprising, under the genetic control of at least one regulatory nucleotide sequence, at least one nucleotide sequence as claimed in claim 6.

9. (original) A recombinant vector comprising at least one expression cassette as claimed in claim 8.

10. (original) A recombinant microorganism comprising at least one recombinant vector as claimed in claim 9.

11. (original) A transgenic mammal comprising a vector as claimed in claim 9.

12. (previously presented) A PARP-deficient mammal or PARP-deficient eukaryotic cell,